ZERO RETRIES

JOURNAL OF THE

NORTHWEST AMATEUR PACKET RADIO ASSN.

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PASSING TRAFFIC ON PACKET

Hooking into the MailBox for Public Service

by Cal Morgan, W7SFT

A recent article in QST magazine described the dismay of an Amateur who was visiting in Hawaii, and inquired of some of the citizenry about local Amateur Radio operators, or clubs. Their replies indicated that they were not even aware of the existance of such a thing as Amateur Radio, and wondered if he meant CB. The amateur concluded that a massive public relations program is needed to make the public aware of who we are and what we do.

Well, while I have no ready solution to this problem, I can suggest a way that each of you may be able to create the opportunity for a little PR on our behalf, while at the same time improving your own preparedness to serve the community in an emergency. I refer to the handling of third-party traffic.

Each time an Amateur delivers traffic to a non-amateur, he has an excellent opportunity to explain briefly just who we are and what we do. Such publicity is one way that you and I can enhance the image of Amateur radio.

However, it should be recognized that anyone who undertakes to handle third-party traffic assumes some important obligations. First, there are legal limitations imposed on us by the FCC which we must observe. There must be no hint of commercialism in the traffic handled. Any Amateur who handles traffic must refuse any which might be regarded as commercial in nature. If there is any question, we must err on the side of conservatism.

Second, in accepting traffic, we agree to either deliver the traffic to its intended recipient, relay it to another Amateur who can send it toward its destination, or, if the traffic is undeliverable for any reason,

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New ROMS for TNC1s

MULTI-CONNECT FIRMWARE BY WA8DED

Several packeteers in the Puget Sound area have been converting their TNC1 type packet boards to AX.25 Level 2 Version 2. They have been installing new multi-channel firmware by Ronald Raikes, WA8DED. You may hear them mention that they are running the new D-E-D code.

The code is contained in two 2764 EPROMs and will plug right into any of the TAPR TNC1s or clones. Additional RAM can be added at the same time, and is recommended because of the multiple connect capability.

The new code makes packet operation much simpler than it was with the original TAPR code. The station is always in a converse mode. It is not necessary to flip in and out of CMD mode to send commands to the TNC. All instructions are sent as an escape

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TRAFFIC ON PACKET

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notify the sender of that fact. Any traffic handling system is only as strong as its weakest link, and unnecessary delays or carelessness along the way can destroy the usefulness of the system.

Third, accuracy is vitally important. Here, Packet gives us an excellent assurance that any message sent will arrive intact, and just as it was sent. However, if it is not typed into the keyboard correctly, it will certainly not be received correctly. As an illustration, consider the message sent home to his wife by a man away from home: "HAVING A WONDERFUL TIME WISH YOU WERE HERE". The only slightly garbled message received by his wife was: "HAVING WONDERFUL TIME WISH YOU WERE HER". Accuracy is of the utmost importance!

Does this sound like something you would like to get involved in? If so, keep an eye on the Traffic portion of the bulletin board. We hope that you will find there both help in the details of handling traffic, and some traffic which you may be able to handle. If you find no traffic there, and are anxious to get into the the act, why not drum up some traffic and put it there for entry into the National Traffic System??

Cal Morgan, W7SFT

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New ROMs for TNC1s

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sequence of characters typed on the keyboard. For example, to connect to the mailbox you would need to type:

[ESC] C WB7DCH WN7ANK-5

You simply begin any command by first touching the [escape] key on your computer ($1B/hex 27/dec.). If your keyboard doesn't show this key you might check the documentation on the terminal software to see how it can be sent. If nothing else works try a ^[(control-left square bracket). Also note that the "v" or "via" is not required in the instruction.

Many of you have noticed the automatic connect messages received by unattended PK64 and TNC2 stations. This feature has been included in the D-E-D code.

Version 2 protocol has some advantages over the original AX.25. Among other things, if the link fails for some reason, such as retires at the other end, the TNC will attempt to rebuilt it automatically.

If a station calls you running the Version 1 protocol, your TNC will automatically switch to match it. One problem we have experienced with protocol compatibility is the fact that TNC1 digipeaters will not digipeat Version 2 packets. This only occurs when TAPR TNC1s or clones are used in the path. All other TNCs, including the local GLB digipeater, work fine.

The firmware will support up to four connects at one time. You can easily limit this number with a simple command. I have found that it works well to limit the maximum number of connects to only 1. Then if another station calls while I am connected, they will get the usual busy report from my TNC. The connect request report that appears on my screen tells me the path used by the second caller. I

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can easily switch to a second channel and call them back if I want to be engaged in more than one QSO at a time.

When connected to more than one station you can send the TNC the command:

[ESC] L

The TNC will report on the status of all channels. You will know if there are packets waiting for you from channels other than the one you are monitoring. You will also know if you have any unacknowleged packets outstanding.

Unlike other TNCs that support mulitple connects, the D-E-D code holds background channel packets until you request them. The packets from two stations are not interlaced together.

I have experimented with home-brewed terminal software and a unique HOST MODE available with this code. The computer can take total control of the TNC. Link status reports, information packets, and the like are only sent to the computer when requested. This code is the long-over-due firmware that mailbox creators have been begging for. In HOST MODE, we finally have a "good dumb-TNC" that anyone who has fought the TAPR USER-SUPER-FRIENDLY code will appreciate.

If you would like to know more about installing the D-E-D code in your TNC, contact Dennis, KB7DZ. You can leave him a note in the WB7DCH MailBox or write to NAPRA using the address on this newsletter.

Budd Churchward, WB7FHC

PACKET RAGCHEW
EVERY THURSDAY AT 9 PM
145.33 REPEATER
+++++++
ONE HOUR EARLIER ON
3877.5KHz

President's Perspective...

by Tom Hogan, President of NAPRA

I would like to start this article with a "thank you" to the NAPRA membership for electing me to the office of President. I will do my best to be worthy of your confidence. We have increased the number of NAPRA offices to seven by splitting the office of Secretary-Treasurer and creating a second Director-at-Large position in order to maintain an odd number of members on the Board. There are three new faces on the Board this year. They are Peter Dahl, WA7FUS, Executive Vice President; Dennis Carpenter, KB7DY, Secretary; and Brett Graham, KB7G, Director-at- Large. Our outgoing Executive Vice President, John Gates, N7BTI, declined the second Director-at-Large position in order to make way for "new blood". John continues to lend strong support to NAPRA through his efforts in "missionary" activity and by his wise counsel at meetings. Thank you, John.

What will be different this year? Most obvious will be the way that meetings are conducted. I intend to limit the duration of the business portion of all meetings that I chair to one hour in order to provide ample time immediately after the meetings for socializing and for special interest groups to get together. A second difference will be in the area of communication. I have asked each member of the Board to post on the MailBox a brief summary of any committee activity involving more than two people. These postings don't have to be eloquent, just who was there, when it happened, what was discussed, what (if anything) was

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resolved, what still needs to be done (if appropriate), and what additional help is needed from NAPRA. Lastly, I intend to delegate the majority of the work. When I ask for volunteers, I will be looking for people willing to accept the responsibility to get particular tasks accomplished, not necessarily to do the actual work. We have a tremendous pool of technical ability in the packet community and the community grows daily. NAPRA currently has over 100 members. There is longer any reason for the majority of the work to be performed by a few people.

Tom Hogan, WB7DCH
President, NAPRA

SET YOUR TIMERS

We can all help alleviate channel congestion by fine-tuning our timers. The manual keyboard users (whether they are talking to another user or to a BBS) generate very litle channel traffic and should have high priority. BBSs should have lower priority and users transferring files between themselves should have the lowest. The DWAIT and RESPTIME commands are the key to doing this. WB6RQN and I have been pushing the following values for DWAIT:

Digis -	0 msec
Keyboard Users -	160 msec
BBS nodes -	320 msec
User file transfers -	480 msec

Note that DWAIT for digis occurs automatically regardless of what the command is set to.

We haven't done much experimenting with RESPTIME but it should be set to at least 400 msec.

Tom Clark/W3IWI
From PSR Quarterly
Jan 86 Page 13

PK64>BEACON:RESET YOUR PARAMETERS

In the last several months new packeteers have been popping up on the air by the dozens. Many of these newcomers are running AEA's Pakratt PK-64. The product is proving to be an ideal packet TNC, especially for those who are making packet radio their first experience with computers.

Like any other TNC, the PK-64 sports a long list of parameter settings that are, if anything, bewildering to the newcomer. Most of them are preset to "default" values (values that are used automatically when it is turned on) that are probably well suited to your operation. There are, however, a few that could be the cause of frustration for some first-time-users.

The Pakratt supports up to as many as 10 connects all at one time. When Bob Churchward, W7RXS, put his PK-64 on the air for the first time, friends seeing his call started connecting to him. In only a few minutes he was linked to several people at once. For a newcomer just ONE contact is a handful!

It was less confusing when he set the CONMAX command at only 1.

Another command that may need changing is TXDELAY. This parameter sets the length of time that the computer will wait after turning the transmitter on, before sending data.

Some radios, like the ICOM hand held, need time to allow the transmitter to stabilize. When we discovered that the N7BTI 220 digipeater was not echoing our packets we changed TXDELAY from the default value of 4 to 8.

Mike Lamb, N7ML of AEA, has told us that later production runs of the PK-64 will use these two values as the regular default settings.

Budd Churchward, WB7FHC

TOO GOOD TO BE TRUE?

PAKRATT™ Model PK-64

shown with enhanced
HFM-64 option installed

★ MORSE ★ BAUDOT ★ ASCII ★ AMTOR ★ PACKET ★

FIRST FIVE MODE DATA CONTROLLER

The Pakratt model PK-64 by AEA is the world's first computer interface that offers Morse, Baudot, ASCII, AMTOR *and* Packet all in one box (hardware *and* software included) at a price many competitors charge for Packet alone (from $219.95 Amateur net). Do not let the low price fool you; coming from any other company but AEA it WOULD be too good to be true. The PK-64 works with virtually any voice transceiver. The Pakratt is the easiest of any to hook up and have operating in just a few minutes.

In Packet mode, the PK-64 offers virtually all the features of every other Packet controller on the market, plus many important features left out by others due to cost constraints. For example. we have included a hardware HDLC, true Data Carrier Detect (DCD), multiple connect with up to ten stations simultaneously and full implementation of version 2.0 of the AX.25 protocol.

Because the PK-64 was designed specifically for the Commodore 64 (or C-128 and SX-64) computer, we have been able to do many things not economically feasible with general RS-232 interface controllers. For example, the Pakratt includes true split screen operation with on-screen status indicators and an on-screen tuning indicator.

ENHANCED HFM-64 MODEM OPTION

The standard PK-64 will operate all modes with a phase-lock-loop (PLL) detector roughly equivalent to all popular packet modems in the marketplace (except we have included extra filtering). The enhanced HFM-64 modem option offers true independent dual channel filtering with A.M. detection (like the famous CP-100 Computer Patch™). The enhanced HFM-64 option also offers a hardware LED tuning indicator (like the CP-100) and a front panel variable threshold control for setting maximum sensitivity under various band conditions. We recommend the HFM-64 option for anyone keenly interested in weak-signal heavy-QRM HF operation. For anyone desiring to operate FM RTTY with the standard North American tone pair or CW receive, the HFM-64 is required. The HFM-64 is field installable with no soldering or test equipment required.

WORKS WITH THE POPULAR C-64 COMPUTER

AEA designed the PK-64 around the low-cost C-64 because of the special architecture features making it especially suited to Amateur Radio applications. The C-64 should not be viewed as a mainframe, but rather a very economical accessory to your data communications system. Many owners of expensive computers such as IBM, TANDY, APPLE, KAYPRO, ATARI, etc., are now buying the low cost C-64 and dedicating it to their operating position. They simply cannot find software for their machine that even approaches the power and user friendliness of the PK-64. Plus, think of the convenience of having only one controller and keyboard to go from one mode to another without having to redo cabling!

The PK-64 is so complete that all you need to do is wire up a microphone connector to the end of a cable (provided) and you are ready to go. There is no need to track down special terminal software, cabling or even a power supply. It all comes with the PK-64. So do not be the last on your block to own the most exciting new product in years. See the PK-64 at your favorite dealer or write for our specification sheet now.

Prices And Specifications Subject To Change Without Notice Or Obligation

Advanced Electronic Applications, Inc.
P.O. Box C-2160, Lynnwood, WA 98036-0918
(206) 775-7373 Telex 6972496 AEA INTL UW

AEA Brings you the Breakthrough!

BEACONS AND MAILBOXES
by Tom Hogan

With the rapid increase in new packeteers in the Northwest we are seeing more and more beacons beacons of the type:

NEWGUY>BEACON HERBIE AIN'T HOME BUT HIS COMPUTER IS! RUNNING THE NEW WHIZZER III WITH AUTO ANSWER. 2 KW INTO A DEATH-RAY AT 90 FT. PLEASE LEAVE A MESSAGE AND DISCONNECT. 73s AND CUL <BELL> BCNU SK

What's wrong with this beacon? Well... If he really is a new guy, there's really nothing wrong that a little diplomacy won't fix. Beacons are really a good way for the new kid on the block to let folks know that he's around. DON'T connect and leave death threats. DO suggest to him that there are some local guidelines concerning beacons. What are the local guidelines? Glad you asked!

** General Rules for Beaconing **

Rule 1: DON'T!

Rule 2: If you really feel that you MUST beacon then:

a. beacon no more often than every 30 minutes.

b. don't beacon thru a digipeater (The only good reason to beacon is to let others know that you have a SUPER location and can provide a path to the hilltop - digipeating thru the hilltop defeats this purpose.)

c. beacon on a timed basis not AFTER hearing activity (Beaconing AFTER sometimes trashes long- haul traffic)

Rule 3: NEVER, EVER, EVER put BELLs in beacons!!!

Exceptions: MailBoxes (10 minute intervals) and QSTs of interest to the packet community (30 minute intervals).

A few things that you could suggest to the newcommer to help him get started might be to: monitor for awhile and then connect to someone; leave a message on the MailBox addressed to NAPRA or ALL; and download the NAPRA membership list from the MailBox to find out who the SERIOUS packeteers are.

Be sure to advise him to ALWAYS go thru the hilltop when on 145.01. (Someone sending files direct will completely block the digipeater and stop all traffic on the LAN.) Connecting to the MailBox direct is a no-no. (The MailBox uses long delays between packets so as not to completely monopolize the frequency.)

The key thing is to be diplomatic! How long has it been since YOU were the new kid on the block? If some LID had jumped on YOU, would YOU still be on packet? Be careful about humor. If the new packet operator is not used to digital communications he may easily misinterpret your humor. If you don't know him, tell him when you are being funny - use the traditional HI HI or the smiley face :-) used widely in networking. [Look at it sideways]

On MailBoxes

With the advent of the newer packet hardware, I am beginning to see longer and longer times between logins by the regular users. Everyone now seems to have their own "mailbox" since the newer hardware will collect messages for its owner. The MailBox may be losing it's traditional(?) role as the central clearing house for local area network information. A lot of us, myself included, are making most of our message traffic "private".

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This isn't so much because we care if other people read what we have written, but rather to cut down on the amount of network time used by folks reading everyone else's mail. In fact, in a recent posting on Usenet, this practice was one of the recommendations made to cut down on the amount of traffic on the LAN. This "reading the mail" is the thing that kept everyone informed about everything happening in the local area - the "glue" that held packet radio together in the "good old days".

Remember the "good old days" when you left monitor mode on and came home to 2K of "neat stuff"? :-) You got 2 or 3 copies of most packets because of digipeating and retries but, heck, it was all "neat stuff". Then came the MailBox. :-(Buffers overflowing with copy after copy of the same stuff! And it wasn't "neat stuff" anymore.

Maybe it's time to rethink the entire role of mailboxes in the system. Perhaps they have served their original purpose and now need to change or perhaps go away entirely.

I don't see mailboxes going away entirely. Since the presence of a mailbox on a LAN pretty well trashes it for nonselective monitoring, what kind of things can mailboxes do for us that would justify their continued existance? Let me begin by describing the "mailbox of the future" as I see it. For one thing, I see it as being multiported, with a port being dedicated to each band that an individual sysop or local group can support financially. At least one of these ports should be a high-speed port dedicated to the nearest network node controller (NNC). It should support multiple connects on each port and be backed up with at least 10 megs of rotating memory. It should be capable of being run on battery power for short periods of time. It must host multitasking operating system software similar to OS-9 or UNIX. A tall order? Maybe not! With the current availability of 68000 based systems (Atari 520SL, Commodore AMIGA) and IBM PC clones, at reasonable prices, the "mailbox of the future" may be close at hand!

Getting back to the original question: What can your friendly local mailbox do for you to justify its continued existance? Well, how about:

- a BBS (How mundane!)
- a multi-LAN activity monitor (calls heard, when, where)
- a path server (How can I connect directly to ... ?)
- a cross-band inter-LAN bridge for virtual circuits
- a "mailman" (Friendly "to your smart TNC" delivery!)
- an address server for the NNC (Where is ... ?)
- a "storage unit" for the NNC
- a satellite gateway
- a gateway into the telephone networks (uucp, AIES ?)

Do any other ideas come to mind for interesting functions that we shouldn't attempt on mountaintops?

de Tom Hogan, WB7DCH
President, NAPRA

Undocumented TNC-2 Command

For all you TNC-2 or clone owners I stumbled (ouch!) upon an undocumented command that is a real short cut. Normally when you want to go from the command mode to the conversation mode you have to type "CONV" as a minimum. Well, if you type instead "K" it will do the same thing! It works like a champ.

Dennis Goodwin, KB7DZ

DOWNLOADED:

Iowa Group Completes Tests of SAREX-2 TNC software

from AMSAT's Telemail network via DRNet

The Central Iowa Technical Society (CITS), with the help of many midwest packet radio operators, has completed testing of terminal node controller (TNC) software destined to be part of the next Shuttle Amateur Radio Experiment (SAREX-2). This major component of our next manned amateur radio operation in space has proven to have the potential of thousands of packet radio QSOs with groundstations around the world.

Software was written by Howard Goldstein, N2WX, of Palm Bay, FL and tested in a Tuscon Amateur Packet Radio Corporation (TAPR) TNC-2 (rev. 2). It follows SAREX-2 system architecture developed by a team lead by Dr. Tom Clark, W3IWI, of the Radio Amateur Satellite Corporation (AMSAT). CITS members provided an intensive test environment by flying the SAREX-2 packet radio system in an aeronautical mobile operation thereby allowing groundstations in several midwest states to provide a significant load test.

Several new packet radio operating capabilities are available in Howard's SAREX-2 TNC2 software which required evaluation under load:

- A "ROBOT" capability allows up to nine simultaneous packet radio QSOs with ground-stations with each QSO meeting amateur radio requirements for information transfer and acknowledgement.

- The SAREX-2 operator can create "META" beacons containing up to seven packets of up to 255-bytes of text each allowing up to 1785- bytes of bulletin information to be repeatedly transmitted on the downlink every 215-seconds.

- HEARD beacons containing up to 25 callsigns from monitored packets (which can be used by groundstations to immediately determine if their packets are being copied in the shuttle and will be used by the SAREX-2 logging scheme to develop a list of all stations HEARD during the mission).

- WORKED beacons containing up to 17 callsigns and QSO serial numbers of stations with whom successful QSOs have been made (which can be used by groundstations to determine if they have just completed a successful QSO and will be used by the SAREX-2 logging scheme to develop a list of all stations WORKED during the mission).

Through the efforts of Tom Clark in Washington, D.C. and TAPR in Tucson, AZ, PROMs containing Howard's SAREX-2 TNC2 program were received in Iowa a few days after Howard released his code. Ten Des Moines area packeteers performed a limited test soon after which yielded over 400 ROBOT QSOs in one hour. This initial operation prepared the group for the more intense aeronautical test which followed.

On Wednesday, December 11th, CITS members Larry Vandewater, NØBKB, Rich Amundson, WAØJFS, and Ray Knapp, WA2GTM, were off the ground with the SAREX-2 system shortly after 1900CST. At the same time, Ralph Wallio, WØRPK, opened information nets on 3857 and 1955 KHz to announce test progress and answer operating questions. A UHF-FM link was maintained with with the aircraft which proved its value toward the end of the flight.

The first SAREX-2 QSO occurred almost immediately and load increased as the aircraft gained altitude. Although the SAREX-2 software allowed nine simultaneous QSOs, several groundstations reported receiving BUSY responses to their CONNECT attempts. Obviously, this was a very busy system.

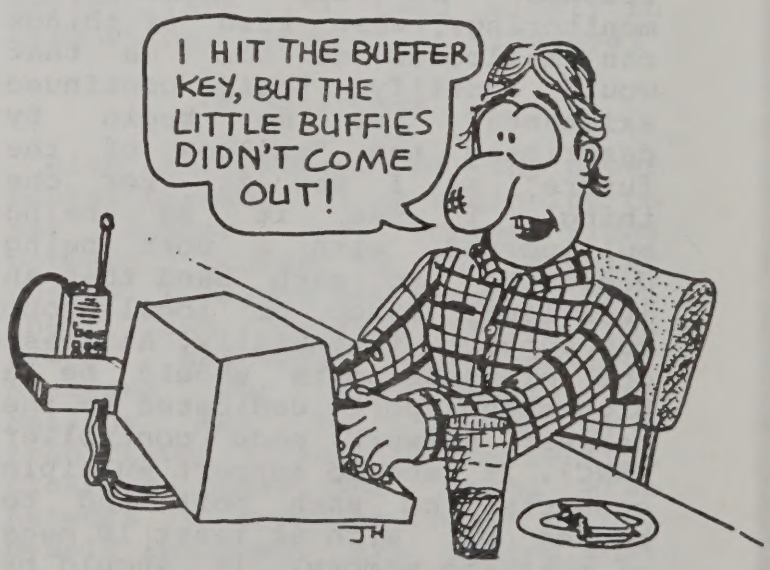
During this one-hour test several groundstations collected packets heard on the "downlink" frequency into disk files which, at the end, contained approximately 154K-bytes of packets. The system allowed 502 successful QSOs which is considered to be near its maximum capability.

Toward the end of the first hour of what was supposed to be a two-hour mission, the aircraft developed mechanical problems. The two highly qualified pilots aboard decided to reduce altitude which meant the flight never made it to 10,000 feet. Unfortunately, this reduced the operating range to approximately 175 miles eliminating participation by expectant packet radio operators in the larger but more distant metropolitan areas of Minneapolis - St. Paul, Chicago and St. Louis.

As the aircraft descended toward the Greenfield airport, the mechanical problem became more serious finally resulting in a dead-stick landing with the prop totally stopped (the last UHF-FM transmission heard was "... we are a glider").

The landing was uneventful, albeit quiet, but the end of the landing roll left the aircraft and SAREX-2 test crew a long way from the hanger on a cold Iowa night. Fortunately, the aircraft was equipped with several forms of two-way radio and a Greenfield police vehicle was soon on the scene. It was a few days before the news was out that a 3/4"-hole was burned into the wall of a cylinder allowing an almost total loss of oil and causing total failure of the engine.

Ralph Wallio, WØRPK for CITS



More Space Shuttle/Packet News

from AMSAT's Telemail network via DRNet

This is an update of Shuttle Amateur Radio Experiment number two (SAREX-2) logging and QSL details including a related agreement between the Goddard Amateur Radio Club (GARC) and Central Iowa Technical Society (CITS). Logging and QSL fulfillment plans are applicable to whatever Shuttle Transportation System (STS) mission SAREX-2 flies with.

Frank Bauer, KAØHDO, GARC president and Ralph Wallio, WØRPK, CITS SAREX-2 project manager, have agreed that GARC will be responsible for design and printing of SAREX-2 QSL cards and for arrangements relating to donations covering QSL costs. They have further agreed that CITS will develop and manage the worldwide SAREX-2 HEARD and WORKED logging scheme and be responsible for SAREX-2 WORKED QSL fulfillment.

Development of IBM-PC programs to produce HEARD and WORKED logs from raw downlink packet files has been completed by CITS member John Maurer, NAØS. Data files created by the recent CITS SAREX-2 flight test have been processed into both HEARD and WORKED logs. Methods to transport downlink data files between volunteer downlink data file collectors (DDFC) and regional data reduction facilities (RDRF) and regional log files between RDRF operators and the CITS master log processing facility (MLPF) are being developed and tested.

CITS member Hasan Schiers, NØAN, RDRF coordinator will complete documentation and instructions for RDRF operators which will be available once STS flight details are known. Also, once flight details are known, Hasan will send RDRF and data file collection recruiting letters to packet radio groups and originate recruiting bulletins (via CITS gateways) on AMSAT Telemail, DRNET and COMPUSERVE HAMNET. These recruiting announcements should get worldwide publicity via AMSAT and packet radio nets and publications.

During SAREX-2 operations, RDRF operators will be responsibile for arrangements necessary to transfer files from DDFC operators in their area and for processing these files into log format. They will then forward logs to the CITS MLPF for final processing. CITS will act as RDRF for DDFC operators who are not more naturally associated with other facilities.

CITS will, with the cooperation of RDRF operators worldwide, process final HEARD and WORKED logs as quickly as possible. Log information will be immediately available for the widest possible publicity.

CITS will arrange for a post office box in Des Moines, IA to receive QSLs and SASEs for QSL fulfillment. A QSL bulletin will be sent for publicity as soon as flight details are known. GARC QSL production will commence once flight details are known and resulting blank cards will be sent to CITS.

CITS will produce a complete set of QSL labels for all WORKED stations which will then wait for receipt of matching QSLs and SASEs. The appropriate adhesive label will be placed on a blank QSL card which will be stuffed into the SASE and mailed. This method will allow timely fulfillment of WORKED QSLs from the thousands of stations expected to successfully complete SAREX-2 QSOs.

Ralph Wallio, WØRPK, for CITS

NORTHWEST AMATEUR PACKET RADIO ASSOCIATION
MEMBERSHIP APPLICATION FORM

[] RENEWAL [] NEW MEMBER

PLEASE PRINT

NAME : _____

CALL SIGN : _____

MAILING ADDRESS : _____

CITY : _____ STATE : ___ ZIP : _____

PHONE NUMBERS: HOME : (_____) _____ - _____

WORK : (_____) _____ - _____

PLEASE INDICATE ANY OF THE ABOVE THAT YOU WOULD NOT WANT PUBLISHED IN A MEMBERSHIP ROSTER.

ANNUAL DUES ARE $15.

MAKE CHECK OR MONEY ORDER PAYABLE TO "NAPRA"

SEND TO : NAPRA Sec./Treas. WB7FHC
Budd Churchward
13304 131st Street KPN
Gig Harbor, WA 98335

OPTIONAL QUESTIONAIRE

1. Packet TNC(s) : _____

2. Computer(s) on packet : _____

3. Band(s) : _____

4. Radio(s) : _____

5. Technical expertise (1 = low, 5 = high) :

Audio Frequency : _____ Radio Frequency : _____

Digital Hardware : _____ Digital Software : _____

NAPRA
13304 131st STREET KPN
Gig Harbor, WA 98335